

AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions, and listings, of claims in the application.

1. (Currently Amended) A method for measuring parameters which describe a particle size distribution of particles in a liquid, which method comprises the steps of:

performing a series of reflection measurements, in each of which a signal beam is generated in the liquid and a measured value (A) of a property of a reflection on a particle in the signal beam is measured;

performing a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), ~~on the basis of~~based on an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for ~~the~~a probability of a reflection measurement of which a reflection with the measured value forms a part, corrected with a second factor (Q) for ~~the~~a probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.

2. (Currently Amended) A method according to claim 1, wherein the first factor (P) comprises the particle size distribution, smeared with a probability distribution that a particle of a particular size leads to a reflection measurement of which a reflection with the measured value forms a part.

3. (Currently Amended) A method according to claim 1~~or 2~~, wherein the second factor (Q) comprises ~~at~~the probability that a reflection with a value other than the measured value forms part of a reflection measurement, integrated over a range of ~~other~~values other than the measured values.

4. (Currently Amended) A method according to claim 3, wherein the second factor substantially corresponds to $\exp(- C \int dA' f_D(D) G(A' | D))$, wherein D is a particle size, C is a concentration of the particles, $f_D(D)$ is a density of particles of particle size D, and $G(A|D)$ is ~~the~~a conditional probability that a reflection with amplitude A is detectable, if a particle of a size D yields a detectable reflection.

5. (Currently Amended) A method according to ~~any one of the preceding claims~~claim 1, wherein the maximum likelihood estimation ~~step~~ comprises performing counts of numbers of reflection, measurements in which the measured values fall into respective value intervals, and ~~the~~an estimate is chosen such that a complex of deviations between ~~the~~ counts in the different intervals and ~~the~~ counts predicted according to ~~the~~a probability as a function of the measured values is minimized.

6. (Currently Amended) A method according to ~~any one of the preceding claims~~claim 1, wherein in the reflection measurements a distinction is made between different types of particles that cause ~~the~~ reflections, and in performing the maximum likelihood estimation ~~step~~ the expression is corrected with a product of respective second factors for the probability that there is not also a reflection with a dominating value of the property by respective types of particles, which would mask the measured value, forming part of the reflection measurement.

7. (Currently Amended) An apparatus for measuring parameters which describe a particle size distribution of particles in a liquid, which apparatus comprises:

a liquid channel;
~~means~~an ultrasonic transducer assembly for generating an ultrasonic beam in the liquid channel;
~~means~~a detector for measuring a property of a reflection of the beam on a particle in the liquid channel ~~to provide a signal corresponding to a measured value;~~
a processing unit arranged for performing a maximum likelihood estimation of the parameters, in view of a combination of ~~a series of~~ the measured values, ~~on the basis of~~based on an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor for ~~the~~a probability of a reflection measurement of which a reflection with the measured value forms part, corrected with a second factor for ~~the~~a probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.

8. (Currently Amended) A computer program product with instructions for measuring parameters which describe a particle size distribution of particles in a liquid, ~~on the basis~~

~~of based on~~ a series of reflection measurements, in each of which a signal beam is generated in the liquid and a measured value (A) of a property of a reflection on a particle in the signal beam is measured; ~~and wherein~~ ~~which~~ the instructions are arranged for performing the steps of:

generating a maximum likelihood estimation of the parameters in view of a combination of the measured values (A), on the basis of an expression for a probability of the measured values as a function of the measured values, which expression contains a first factor (P) for ~~the~~ a probability of a reflection measurement of which a reflection with the measured value forms a part, corrected with a second factor (Q) for ~~the~~ a probability that there is not also a reflection with a dominating value of the property, which would mask the measured value, forming part of the reflection measurement.

9. (New) A method according to claim 2, wherein the second factor (Q) comprises a probability that a reflection with a value other than the measured value forms part of a reflection measurement, integrated over a range of values other than the measured values.

10. (New) A method according to claim 9, wherein the second factor substantially corresponds to $\exp(- C \int dA' \int dD f_D(D) G(A'|D))$, wherein D is a particle size, C is a concentration of the particles, $f_D(D)$ is a density of particles of particle size D, and $G(A|D)$ is a conditional probability that a reflection with amplitude A is detectable, if a particle of a size D yields a detectable reflection.